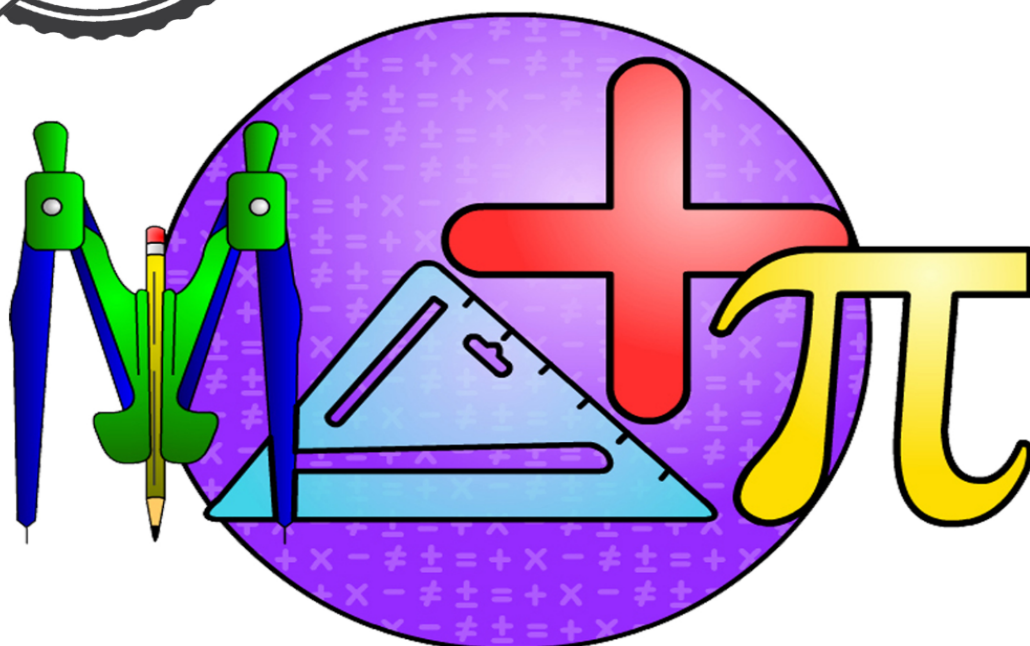




The Legend



First term

Student Name

Class

Just for Study groups

Answer the following questions :

1 Choose the correct answer from those given :

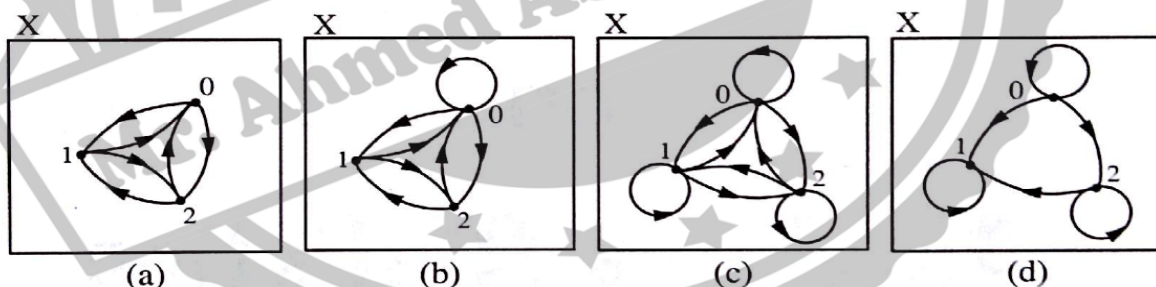
(1) If : $X = \{1, 3, 5\}$, $Y = \{2, 4\}$, then : $n(X \times Y) = \dots\dots\dots$

- (a) 3 (b) 6 (c) 5 (d) 2

(2) If : $X = \{2, 1\}$, $Y = \{1, 3\}$, then : $Y \times X = \dots\dots\dots$

- (a) $\{(2, 1), (2, 3), (1, 1), (1, 3)\}$
 (b) $\{(2, 1), (2, 3), (1, 3)\}$
 (c) $\{(1, 2), (1, 1), (3, 2), (3, 1)\}$
 (d) $\{(2, 2), (2, 1), (1, 2), (1, 1)\}$

(3) If : $X = \{0, 1, 2\}$, then the arrow diagram which represents X^2 is $\dots\dots\dots$



(4) If : $(3^x, y^3) = (27, 8)$, then : $(x, y) = \dots\dots\dots$

- (a) (2, 2) (b) (-1, 3) (c) (3, 2) (d) (-3, 2)

(5) If : $(2, 3) \in \{2, 5\} \times \{x, 6\}$, then : $x = \dots\dots\dots$

- (a) 6 (b) 5 (c) 3 (d) 2

(6) If : $n(X^2) = 9$, $n(X \times Y) = 6$, then : $n(Y^2) = \dots\dots\dots$

- (a) 3 (b) 2 (c) 9 (d) 4

2 [a] If : $X = \{-1, 0, 1\}$, $Y = \{1, 2\}$ Find : $X \times Y$ and represent it by cartesian diagram.

[b] If : $X \times Y = \{(2, 3), (2, 4)\}$ Find : Y^2 and represent it by an arrow diagram.

3 If : $X = \{1, 2, 6\}$, $Y = \{2, 4, 5, 6\}$, $Z = \{4\}$

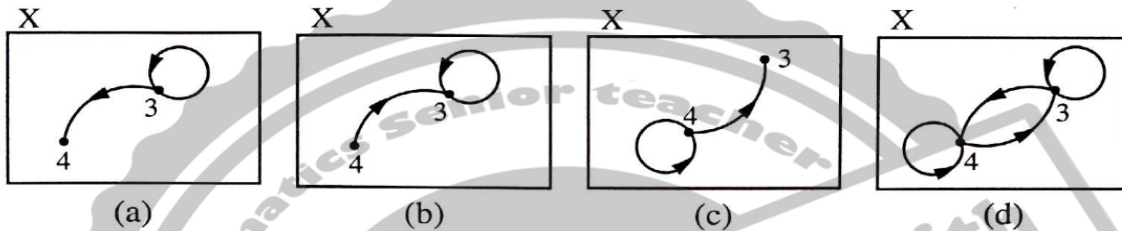
Represent the sets X , Y and Z by Venn diagram , then find :

- (1) $(X \cap Y) \times Z$ (2) $(Y - Z) \times X$

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $X = \{3, 4\}$, then the arrow diagram which represents a function on X is



(2) If $(X - 3, 2^y) = (2, 32)$, then $(y, X) = \dots\dots\dots$

- (a) $(2, 5)$ (b) $(2, 2)$ (c) $(5, 2)$ (d) $(5, 5)$

(3) If $n(X) = 4$, $n(Y) = 2$, then $n(X \times Y) = \dots\dots\dots$

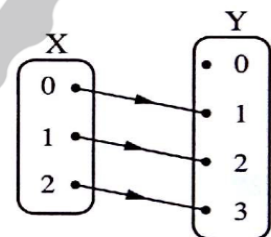
- (a) 4 (b) 2 (c) 6 (d) 8

(4) If $(b + 3, 5)$ lies on y-axis, then $b = \dots\dots\dots$

- (a) zero (b) 3 (c) -3 (d) 5

(5) The opposite figure represents a function from X to Y , its range =

- (a) $\{0, 1, 2\}$ (b) $\{1, 2, 3\}$
 (c) $\{0, 1, 2, 3\}$ (d) $\{(0, 1), (1, 2), (2, 3)\}$



(6) If $X = \{1, 2, 3\}$, then $n(X \times \emptyset) = \dots\dots\dots$

- (a) 3 (b) \emptyset
 (c) 0 (d) $\{(1, 0), (2, 0), (3, 0)\}$

2 If $X = \{-2, -1, 0, 1, 2\}$ and R is a relation on X , where " $a R b$ " means " a is the additive inverse of b " for each $a \in X, b \in X$

(1) Write R and represent it by an arrow diagram.

(2) Is R a function? Why?

3 If $X = \{4, 6, 8, k\}$, $Y = \{5, 4, 3, 2\}$ and R is a relation from X to Y , where " $a R b$ " means " $b = \frac{a}{2}$ " for each $a \in X, b \in Y$

(1) Find the value of k that makes R is a function from X to Y

(2) Represent the function by a Cartesian diagram.

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $X = \{2, 4, 6\}$ and the function $f : X \longrightarrow \mathbb{R}$ where $f(x) = 2x + 1$, then the range of the function $f = \dots\dots\dots$

- (a) $\{5, 9, 13\}$ (b) $[5, 13]$ (c) $\{2, 4, 6\}$ (d) \mathbb{R}

(2) If the point (a, b) lies in the second quadrant, then a $\dots\dots\dots$ zero

- (a) $=$ (b) $>$ (c) $<$ (d) \geq

(3) If $f(x) = x^2 - x + 3$, then $f(3) = \dots\dots\dots$

- (a) 3 (b) 6 (c) 9 (d) 12

(4) If $(4, a) \in$ the set of the function f where $f(x) = x + 1$, then $a = \dots\dots\dots$

- (a) 3 (b) 4 (c) 5 (d) 6

(5) If $X \times Y = \{(2, 3), (2, 4), (2, 5)\}$, then $n(X^2) = \dots\dots\dots$

- (a) $\{2\}$ (b) 4 (c) 1 (d) $\{4\}$

(6) The function $f : f(x) = x^3 - (x^3 + 7)$ is a polynomial function of the $\dots\dots\dots$ degree.

- (a) first (b) second (c) third (d) zero

2 If the function $f : \mathbb{Z} \longrightarrow \mathbb{Z}$ where $f : x \longrightarrow 2x - 1$

(1) Find : $f(1)$, $f(-2)$, $f(0)$, $f(2)$

(2) Draw a part of the perpendicular square net of the cartesian product $\mathbb{Z} \times \mathbb{Z}$ and represent on it some elements of f

(3) If $f(x) = 9$, then find the value of x

3 If the function $f = \{(0, 4), (1, 3), (2, 2), (3, 1)\}$

(1) Write each of domain and range of the function f

(2) Write the rule of the function f

| | |
|--------|---|
| To | |
| Lesson | 4 |
| Unit | 1 |

Answer the following questions :

1 Choose the correct answer from those given :

- (1) The function $f : f(x) = x^2 - (x - 3)^2$ is a polynomial of degree.
 (a) first (b) second (c) third (d) fourth
- (2) Which of the following represents a rule for a polynomial ?
 (a) $f(x) = x \left(\frac{1}{x} + 1 \right)$ (b) $f(x) = 2x^{-3} + 5$
 (c) $f(x) = x^2 + \sqrt{x}$ (d) $f(x) = \frac{1}{3}x^2 - 5x + 1$
- (3) If $X = \{1, 3, 5\}$ and $n(Y) = 4$ and the function $f : X \rightarrow Y$, where $f(x) = x + 2$, then Y may be
 (a) $\{3, 5, 7\}$ (b) $\{3, 4, 5, 6\}$
 (c) $\{1, 2, 3, 5\}$ (d) $\{3, 4, 5, 7\}$
- (4) The linear function which is defined by the rule $y = 1 - 2x$ is represented graphically by a straight line intersects X-axis at the point
 (a) $(1, 0)$ (b) $(0, 1)$ (c) $\left(\frac{1}{2}, 0\right)$ (d) $\left(0, \frac{1}{2}\right)$
- (5) If $f(x) = 5$, then $f(5) + f(-5) =$
 (a) 0 (b) -10 (c) 10 (d) $f(10)$
- (6) If $f(x) = 2x + b$, $f(3) = \text{zero}$, then $b =$
 (a) 0 (b) -6 (c) 6 (d) 3

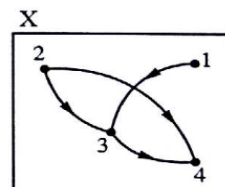
2 [a] The opposite arrow diagram shows the relation R on X, where $X = \{1, 2, 3, 4\}$

Write R, then show if R is a function or not. Give reasons.

[b] Graph the function $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = 2x - 4$

(1) From the graph find the points of intersection with X-axis and y-axis.

(2) If $f(a) = 20$, find the value of a



3 Graph the function $f : f(x) = 3 - 2x - x^2$ in \mathbb{R} taking $x \in [-4, 2]$, then find :

- (1) The maximum value or the minimum value of the function.
 (2) The equation of the axis of symmetry.

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| To | |
| Lesson | 1 |
| Unit | 2 |

Answer the following questions :

1 Choose the correct answer from those given :

- (1) The second proportional of the quantities 6 , 3 and 8 is
 (a) 48 (b) 16 (c) $\frac{28}{9}$ (d) $\frac{1}{7}$
- (2) If a , 3 X , b and 9 X are proportional quantities , then $\frac{a}{b} = \dots\dots\dots$
 (a) 9 (b) 3 (c) 6 (d) $\frac{1}{3}$
- (3) If $f(X) = 5$, then $f(-2X) = \dots\dots\dots$
 (a) -10 (b) 10 (c) -5 (d) 5
- (4) If $X = \{1, 2, 3\}$, then the relation that represent a function on X is
 (a) $\{(1, 1), (1, 2), (1, 3)\}$ (b) $\{(1, 1), (2, 1), (3, 1)\}$
 (c) $\{(1, 1), (2, 2), (2, 3)\}$ (d) $\{(1, 1), (2, 2)\}$
- (5) If $4X^2 - 12Xy + 9y^2 = 0$, $X \in \mathbb{R}$, $y \in \mathbb{R}$, then $\frac{X}{y} = \dots\dots\dots$
 (a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
- (6) If $\frac{a}{b} = \frac{2}{3}$, $\frac{a}{c} = \frac{3}{5}$, then $a : b : c = \dots\dots\dots$
 (a) 2 : 3 : 5 (b) 6 : 9 : 10 (c) 2 : 6 : 5 (d) 6 : 3 : 10

2 [a] If $X = \{1, 2, 3\}$, $Y = \{9, 1, 6, 3\}$ and R is a relation from X to Y where "a R b" means " $a = \frac{1}{3} b$ " for each $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram. Is R a function from X to Y ? and if " $3 R X$ " , then find : \sqrt{X}

[b] Find the number , if its square is subtracted from the terms of the ratio 49 : 69 , then it will become $\frac{2}{3}$

3 [a] If $\frac{a}{b} = \frac{2}{5}$, then find the value of the expression : $3a + 2b : 5a - b$

[b] If $\frac{a}{b-a} = \frac{c}{d-c}$, then prove that : a , b , c and d are proportional.

Answer the following questions :

1 Choose the correct answer from those given :

- (1) If $5a = 9b$, then $\left(\frac{a}{b}\right)^{-1} = \dots\dots\dots$
 (a) $\frac{9}{5}$ (b) $\frac{25}{81}$ (c) $\frac{5}{9}$ (d) $\frac{81}{25}$
- (2) If $\frac{a}{b} = \frac{c}{d} = \frac{2}{3}$, then $\frac{a+2c}{b+2d} = \dots\dots\dots$
 (a) $\frac{4}{9}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $\frac{1}{3}$
- (3) The set of images of the elements of the domain of a function f is called
 (a) domain of the function. (b) codomain of the function.
 (c) range of the function. (d) rule of the function.
- (4) If $(a, -a)$ is an element of R of the function f where $f(x) = 2x - 3$, then $a = \dots\dots\dots$
 (a) 1 (b) 2 (c) 3 (d) -3
- (5) $\frac{a}{2} = \frac{c}{3} = \frac{e}{4} = \frac{2a+3c-2e}{\dots\dots\dots}$
 (a) -5 (b) 9 (c) 5 (d) 3
- (6) $\frac{xz}{y} = \frac{4x^2z}{\dots\dots\dots}$
 (a) $4z$ (b) $4y$ (c) $4x$ (d) $4xy$

2 [a] If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ Prove that : $\frac{7a+5c-e}{7b+5d-f} = \frac{c}{d}$

[b] Find the number which is added to each of the following numbers : 5 , 7 , 21 , 27 , then they will become proportional.

3 [a] If x, y, z and l are proportional quantities ,

then prove that : $\frac{x^2 + 2z^2}{y^2 + 2l^2} = \frac{xz}{yl}$

[b] Represent graphically the function $f : f(x) = (x-2)^2$ taking $x \in [-1, 5]$, from the graph deduce :

- (1) The maximum or minimum value of the function.
 (2) The equation of the axis of symmetry.

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| To | |
| Lesson | 3 |
| Unit | 2 |

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $x, 4, 6, 2$ are four proportional quantities, then $x = \dots\dots\dots$

- (a) 12 (b) $\frac{4}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{12}$

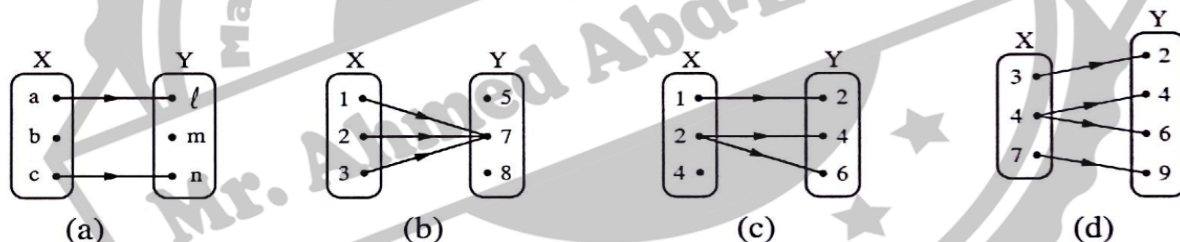
(2) The proportional mean between $(x-3), (x+3) = \dots\dots\dots$

- (a) $\sqrt{x+3}$ (b) $x^2 - 9$ (c) $\pm\sqrt{x^2 - 9}$ (d) $\pm(x^2 - 9)$

(3) If $(x^3 - 2, y - 2) = (25, |\sqrt[3]{-8}|)$, then $(y, x) = \dots\dots\dots$

- (a) (3, 0) (b) (0, 3) (c) (3, 4) (d) (4, 3)

(4) Which of the following relations represents a function from X to Y ?



(5) If $\frac{a}{b} = \frac{c}{d} = \frac{1}{4}$, then $\frac{a+c}{b+d} = \dots\dots\dots$

- (a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) 4

(6) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{5} = 2$, then $a = \dots\dots\dots$

- (a) 5×2^2 (b) 40 (c) -1 (d) 2×5^3

2 [a] If a, b, c, d are in continued proportion, prove that : $\frac{a^3 + b^3}{b^3 + c^3} = \frac{a^2}{bc}$

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$ Find the value of : x

3 Graph the function $f : f(x) = x^2 - 4$ in the interval $[-3, 3]$ and from the graph find :

- (1) The coordinates of the vertex of the curve.
- (2) The equation of the axis of symmetry.
- (3) The maximum of minimum value of the function.

Answer the following questions :

1 Choose the correct answer from those given :

- (1) If $y \propto \frac{1}{x^2}$, then y varies
- (a) directly as x (b) directly as x^3
 (c) directly as x^2 (d) inversely as x^2
- (2) If $\frac{a}{3} = \frac{b}{4}$, then : $4a - 3b + 5 = \dots\dots\dots$
- (a) 4 (b) 3 (c) 5 (d) 7
- (3) The function $f : f(x) = x(2x - 1)^2 + 3$ is a polynomial of the degree.
- (a) first (b) second (c) third (d) fourth
- (4) The middle proportion between x and y is
- (a) xy (b) \sqrt{xy} (c) $-\sqrt{xy}$ (d) $\pm\sqrt{xy}$
- (5) If $(3, 4) \in \{3, 6\} \times \{x, 7\}$, then $x = \dots\dots\dots$
- (a) 3 (b) 6 (c) 4 (d) 7
- (6) If x varies inversely as y , then $\frac{y_1}{y_2} = \dots\dots\dots$
- (a) $\frac{m x_1}{x_2}$ (b) $\frac{x_1}{x_2}$ (c) $\frac{x_2}{x_1}$ (d) $\frac{1}{x_1 x_2}$

2 [a] If $\frac{a^2 + b^2}{b^2} = \frac{b^2 + c^2}{c^2}$, then prove that : b is the middle proportional between a and c

[b] If $X = \{2, 3, 4\}$, $Y = \{y : y \in \mathbb{N}, 2 \leq y < 9\}$ where \mathbb{N} is the set of natural numbers and R is a relation from X to Y where " aRb " means " $a = \frac{1}{2}b$ " for each $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram, is R a function from X to Y? find the range if it is a function.

3 [a] If $4x^2 + 9y^2 = 12xy$, then prove that : x varies directly as y

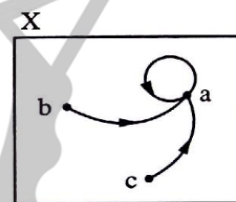
[b] If the speed of expression v of water to pass through a hose nozzle inversely changes with the square of the hose nozzle radius length r and $v = 5$ cm./sec. when $r = 3$ cm. Find v when $r = 3\frac{3}{4}$ cm.

| | |
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| To | |
| Lesson | 1 |
| Unit | 3 |

Answer the following questions :

1 Choose the correct answer from those given :

- (1) Choosing a sample from the society's layers in statistics is called a sample.
 (a) homogeneous (b) layer (c) intentional (d) cluster
- (2) The relation that represents a direct variation between x and y is
 (a) $xy = 5$ (b) $y = x - 4$ (c) $\frac{x}{3} = \frac{4}{y}$ (d) $\frac{x}{7} = \frac{y}{5}$
- (3) If 4, -10 and x are proportional quantities, then $x =$
 (a) -5 (b) 5 (c) -25 (d) 25
- (4) The opposite figure : represent a function on X , its range is
 (a) $\{a\}$ (b) $\{a, b, c\}$
 (c) $\{a, b\}$ (d) $\{b, c\}$
- (5) If $(x - 5, x + 3)$ lies in the second quadrant, then $x =$
 (a) 3 (b) 5 (c) 7 (d) 9
- (6) The vertex of the curve of the quadratic function f is the point $(2, -1)$, then the equation of the axis of symmetry is
 (a) $x = 2$ (b) $x = -2$ (c) $x = 1$ (d) $x = -1$



- 2** One of the car factories produced 3000 cars of model (A), 1000 cars of model (B), 2000 cars of model (C) and 4000 cars of model (D). If we want to draw a layer sample of size 500 cars to represent each layer due to its size.

Calculate the number of individuals of each layer in the sample.

- 3** [a] If a, b, c and d are in continued proportional, then prove that : $\frac{ab - cd}{b^2 - c^2} = \frac{a + c}{b}$

[b] If the weight of body on Earth (R) directly varies with its weight on the moon (W), If $R_1 = 182$ kg., $W_1 = 35$ kg., then find : W_2 when $R_2 = 312$ kg.

Answer the following questions :

1 Choose the correct answer from those given :

- (1) If $9x^2 + 25y^2 = 30xy$, then $\frac{x}{y} = \dots\dots\dots$
 (a) $\frac{9}{25}$ (b) $\frac{9}{30}$ (c) $\frac{5}{3}$ (d) $\frac{3}{5}$
- (2) If $X = \{3\}$, then $X^2 = \dots\dots\dots$
 (a) $\{3\}$ (b) $\{9\}$ (c) $\{(3, 9)\}$ (d) $\{(3, 3)\}$
- (3) The linear function $f : f(x) = 2x - 1$ is represented by a straight line intersecting the x -axis at the point $\dots\dots\dots$
 (a) $(0, 1)$ (b) $(0, -1)$ (c) $(\frac{1}{2}, 0)$ (d) $(-\frac{1}{2}, 0)$
- (4) If $\sum (x - \bar{x})^2 = 36$ of a set of values and the number of values equals 9, then $\sigma = \dots\dots\dots$
 (a) 2 (b) 4 (c) 18 (d) 27
- (5) The range of the values : 3, 17, 12, 30, 28 is $\dots\dots\dots$
 (a) 3 (b) 27 (c) 33 (d) 30
- (6) From the measures of dispersions is the $\dots\dots\dots$
 (a) mean. (b) median.
 (c) mode. (d) standard deviation.

2 The following is the frequency distribution of the number of damaged units which were found in 100 boxes of the produced units.

| Number of damaged units | zero | 1 | 2 | 3 | 4 | 5 |
|-------------------------|------|----|----|----|----|----|
| Number of boxes | 3 | 16 | 17 | 25 | 20 | 19 |

Find the standard deviation of the damaged units.

3 [a] If $x = z + 8$, z varies inversely as y and $z = 2$, when $y = 3$

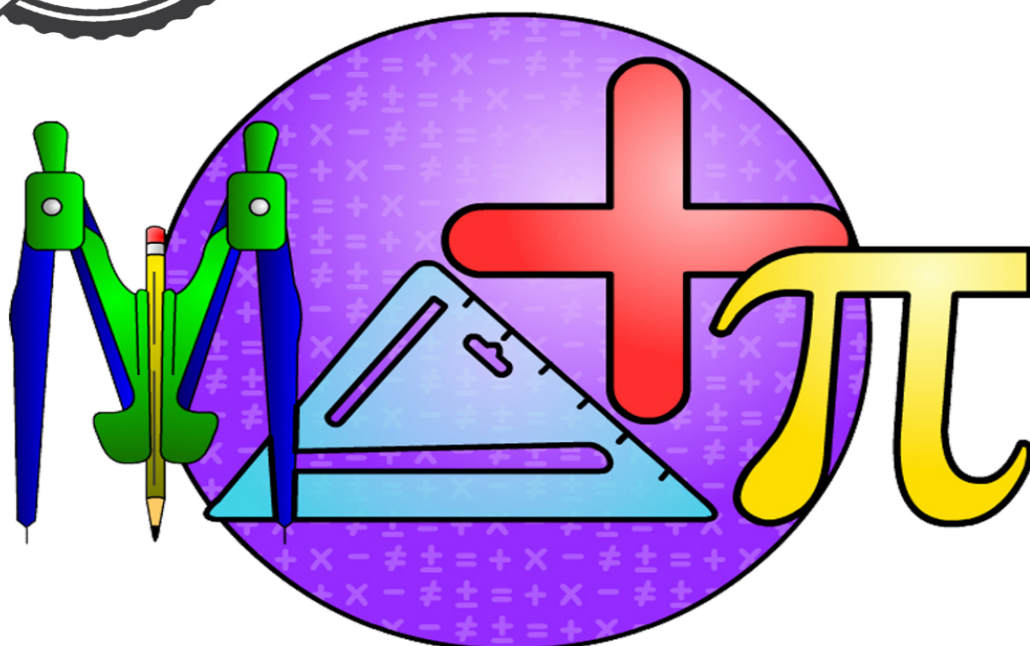
Find : y when $x = 3$

[b] If $X = \{-2, 2, 3\}$, $Y = \{3, 5, \ell\}$ and the relation R is from X to Y , where " $a R b$ " means " $b = a^2 - 1$ " for every $a \in X$, $b \in Y$ represents a function from X to Y

- (1) Find the value of ℓ
 (2) Represent the function R by an arrow diagram and another graphical diagram.
 (3) Mention the range of the function.



The Legend



First term

Student Name

Class

Just for Study groups

| | |
|--------|---|
| To | |
| Lesson | 1 |
| Unit | 4 |

Answer the following questions :

1 Choose the correct answer from those given :

(1) In the opposite figure :

ΔABC in which : $m(\angle A) = 90^\circ$,

$AB = 5$ cm. and $BC = 13$ cm. , then $\tan B = \dots\dots\dots$

- (a) $\frac{5}{13}$ (b) 2.4 (c) $\frac{13}{5}$ (d) $\frac{25}{12}$

(2) If ΔABC is a right-angled triangle at B and $\cos A = 0.6$, then $\sin A = \dots\dots\dots$

- (a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{3}$

(3) In the opposite figure :

$\sin A + \sin C = \dots\dots\dots$

- (a) 1 (b) 2
(c) $\frac{17}{25}$ (d) $\frac{31}{25}$

(4) If ΔABC is a right-angled triangle at B , $\sin A = \frac{16}{20}$ and $BC = 4$ cm. , then the area of $\Delta ABC = \dots\dots\dots$ cm.²

- (a) 6 (b) 12 (c) 24 (d) 96

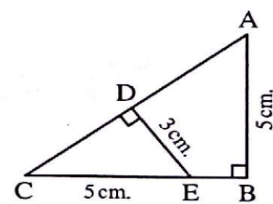
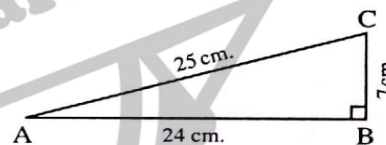
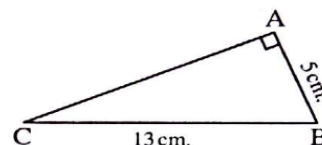
(5) For any two acute angles , if $m(\angle A) + m(\angle B) = 90^\circ$, then $\dots\dots\dots$

- (a) $\sin A = \cos B$ (b) $\sin A = \sin B$
(c) $\tan A = \tan B$ (d) $\cos A = \cos B$

(6) In the opposite figure :

$AC = \dots\dots\dots$ cm.

- (a) $\frac{3}{25}$ (b) $\frac{5}{3}$
(c) $\frac{25}{3}$ (d) $\frac{3}{5}$



2 ΔABC in which : $AB = AC = 10$ cm. , $BC = 16$ cm. Draw $\overline{AD} \perp \overline{BC}$ such that : $\overline{AD} \cap \overline{BC} = \{D\}$

Prove that :

- (1) $\sin^2 C + \cos^2 C = 1$ (2) $\sin B + \cos C > 1$

3 ABCD is a trapezium in which : $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$ If : $AB = 4$ cm. , $AD = 7$ cm. , $BC = 10$ cm.

Prove that : $\cos(\angle DCB) - \tan(\angle ACB) = \frac{1}{5}$

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| To | |
| Lesson | 2 |
| Unit | 4 |

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $\sin X = \frac{\sqrt{3}}{2}$ where X is the measure of an acute angle , then $X = \dots\dots\dots$

- (a) 30° (b) 45° (c) 60° (d) 90°

(2) If $\triangle ABC$ is a right-angled triangle at B , $\sin C = \frac{3}{5}$ and $AB = 6$ cm. , then $AC = \dots\dots\dots$ cm.

- (a) 5 (b) 10 (c) 6 (d) 3

(3) $\sin^2 30^\circ + \cos^2 30^\circ = \dots\dots\dots$

- (a) $\frac{\sqrt{3}+1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

(4) If $\tan 3X = \frac{1}{\sqrt{3}}$ where $3X$ is the measure of an acute angle , then $X = \dots\dots\dots$

- (a) 10° (b) 20° (c) 30° (d) 40°

(5) In the opposite figure :

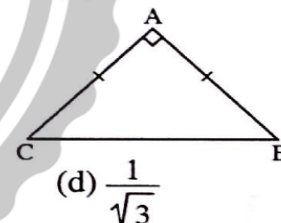
$AB = AC$, $m(\angle A) = 90^\circ$

, then $\tan C = \dots\dots\dots$

- (a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$

(6) If $m(\angle A) = 75^\circ$, $\sin B = \cos A$, where $\angle B$ is an acute angle , then $m(\angle B) = \dots\dots\dots$

- (a) 45° (b) 75° (c) 15° (d) 105°



2 [a] Without using the calculator , find the value of X that satisfies :

$\sqrt{3} \tan X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ (where X is the measure of an acute angle)

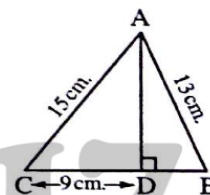
[b] In the opposite figure :

$\overline{AD} \perp \overline{BC}$, $AB = 13$ cm. ,

$AC = 15$ cm. , $CD = 9$ cm.

Find in the simplest form the value of the expression :

$$\frac{\tan(\angle CAD) + \tan(\angle BAD)}{\tan(\angle CAD) - \tan(\angle BAD)}$$



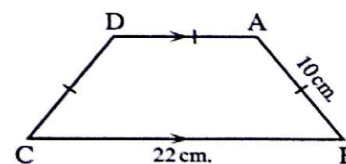
3 In the opposite figure :

ABCD is an isosceles trapezium in which :

$AB = AD = DC = 10$ cm. , $BC = 22$ cm.

Find : (1) $m(\angle B)$, $m(\angle A)$

(2) The area of the trapezium ABCD



Answer the following questions :

1 Choose the correct answer from those given :

- (1) The distance between the point (2 , 3) and the origin point equals
- (a) $\sqrt{5}$ (b) $\sqrt{7}$ (c) $\sqrt{11}$ (d) $\sqrt{13}$
- (2) The distance between the point (2 , - 4) and the X-axis = length unit.
- (a) 2 (b) - 4 (c) $2\sqrt{5}$ (d) 4
- (3) $\sin 60^\circ + \cos 30^\circ = \dots\dots\dots$
- (a) zero (b) $\sqrt{3}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1
- (4) If $\sin C = 0.8$ where C is the measure of an acute angle , then $\cos C = \dots\dots\dots$
- (a) 0.8 (b) $\frac{3}{5}$ (c) 1 (d) 0.2
- (5) If $\cos 3X = \frac{1}{2}$ where 3 X is the measure of an acute angle , then X =
- (a) 10° (b) 20° (c) 60° (d) 90°
- (6) If the distance between the two points (k , 0) , (0 , 3) is 5 length units , then k =
- (a) 2 (b) 4 (c) - 4 (d) ± 4

2 [a] If the point A (8 , 9) lies on the circle whose centre is M (2 , 1) , find the area of this circle ($\pi = 3.14$)

[b] XYZ is a right-angled triangle at Y , in which XY = 5 cm. , XZ = 13 cm.

Find the value of : $\cos X \cos Z - \sin X \sin Z$

3 [a] If A (X , 2) , B (3 , 1) , C (5 , 0) and AB = BC , then find the value of X

[b] Prove that : the points A (0 , 2) , B (1 , 5) , C (2 , 8) are collinear.

| | |
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| To | |
| Lesson | 2 |
| Unit | 5 |

Answer the following questions :

1 Choose the correct answer from those given :

- (1) If A (1 , 2) , B (3 , - 4) , then the coordinates of the midpoint of \overline{AB} is
- (a) (2 , 4) (b) (2 , - 1) (c) (2 , 1) (d) (- 2 , 1)
- (2) If ΔABC in which $AB = BC = 5$ cm. , $AC = 5\sqrt{2}$ cm. , then $\tan (\angle C) = \dots\dots\dots$
- (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$
- (3) If the distance between the two points A (3 , 1) , B (6 , x) is 5 length units , $x \in \mathbb{Z}_+$, then $x = \dots\dots\dots$
- (a) 1 (b) 3 (c) 5 (d) - 3
- (4) If the origin point is the midpoint of \overline{AB} where A (2 , - 3) , then B =
- (a) (- 3 , 2) (b) (- 2 , 3) (c) (- 2 , - 3) (d) (2 , 3)
- (5) If $\sin (x - 5) = \frac{1}{2}$ where x is the measure of an acute angle , then $x = \dots\dots\dots$
- (a) 30° (b) 25° (c) 35° (d) 40°
- (6) If M (5 , - 1) is the midpoint of \overline{AB} where A (4 , y) , B (6 , 7) , then y =
- (a) 9 (b) 5 (c) - 5 (d) - 9

2 [a] If $\tan 2x = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$ where $2x$ is the measure of an acute angle , then find x

[b] If \overline{AB} is a ladder of length 4 m. , leans with its upper end A upon a vertical wall and with lower end B on a horizontal land. If the measure of the angle of inclination of the ladder on the land = 60° , find the length of \overline{AC} such that AC is the distance between its upper end A and the surface of the land.

3 If A (- 1 , 3) , B (4 , 3) , C (7 , 7) ,

Prove that : ΔABC is an isosceles triangle and calculate its area.

Answer the following questions :

1 Choose the correct answer from those given :

- (1) The straight line which passes through the two points (0 , 0) and (2 , 5) is parallel to the straight line whose slope equals
 (a) $\frac{5}{2}$ (b) $\frac{2}{5}$ (c) $-\frac{5}{2}$ (d) $-\frac{2}{5}$
- (2) If the straight line L is perpendicular to the straight line passing through the two points (3 , -1) and (0 , -2) , then the slope of L =
 (a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) 3 (d) -3
- (3) If the points A (0 , 0) , B (5 , 7) and C (5 , k) are the vertices of the right-angled triangle ABC at C , then k =
 (a) zero (b) 5 (c) 7 (d) -5
- (4) In the right-angled triangle ABC at B
 If $\sin C = \frac{3}{5}$ and AB = 6 cm. , then AC = cm.
 (a) 5 (b) 10 (c) 6 (d) 3
- (5) If X and y are the two measures of two supplementary angles such that $X : y = 1 : 2$, then $\sin X =$
 (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$
- (6) The straight line which passes through the two points (1 , 1) and (2 , 2) makes with the positive direction of X-axis an angle of measure
 (a) 30° (b) 60° (c) 45° (d) 90°

2 [a] If $\cos 3X = \frac{\sin 60^\circ \sin 30^\circ}{\tan 45^\circ \sin^2 45^\circ}$, find the value of X in degrees where 3 X is the measure of an acute angle.

[b] If A (2 , 2) , B (1 , -1) , C (-2 , -2) and D (-1 , 1) are four points in a perpendicular coordinates plane , **prove that** : the figure ABCD is a rhombus and find its area.

3 **Prove that** : The straight line which passes through the two points (3 , -2) and (6 , 1) is parallel to the straight line which makes an angle of measure 45° with the positive direction of X-axis.

Answer the following questions :

1 Choose the correct answer from those given :

- (1) The straight line whose equation is : $2x - 3y = 12$ intercepts from the negative part of y-axis a part of length length unit.

(a) 4 (b) -4 (c) 12 (d) $\frac{2}{3}$

- (2) \overline{AB} is a straight line passing through the two points (2 , 5) and (5 , 2)
Which of the following points belongs to \overline{AB} ?

(a) (1 , 6) (b) (2 , 3) (c) (0 , 0) (d) (3 , -4)

- (3) In the opposite figure :

$\sin B + \cos C = \dots\dots\dots$

(a) 1 (b) $\frac{8}{5}$
(c) $\frac{6}{5}$ (d) zero

- (4) The two straight lines whose slopes are $\frac{4}{5}$ and $-\frac{5}{4}$ are

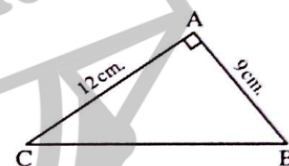
(a) parallel. (b) perpendicular.
(c) coincident. (d) not perpendicular.

- (5) If $\sin X = \cos 30^\circ$ and X is the measure of an acute angle , then $X = \dots\dots\dots$

(a) 90° (b) 60° (c) 45° (d) 30°

- (6) The equation of the straight line whose slope equals $\frac{1}{2}$ and intercepts 3 length unit from the negative part of y-axis is

(a) $2y = x - 3$ (b) $2y - x - 6 = 0$
(c) $2y - x + 6 = 0$ (d) $2y + x - 6 = 0$



2 If the points A (1 , 0) , B (- 1 , 4) , C (7 , 8) and D (9 , 4)

- (1) **Prove that :** $\overline{BA} \parallel \overline{CD}$ and equal in length.

- (2) **Prove that :** $m(\angle ABC) = 90^\circ$

- (3) **Find :** the equation of the straight line which passes through the two points A and C

3 [a] Without using calculator , find the value of : $\frac{\tan 30^\circ (1 - \tan^2 30^\circ)}{\sin 30^\circ \cos 30^\circ}$

- [b] **Prove that :** The triangle whose vertices are A (3 , 2) , B (- 4 , 1) and C (2 , - 1) is right-angled , then find $m(\angle B)$